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Before The
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of:	)	
	)	
Request for Declaratory Ruling	)	MM Dkt. No. 01-145
Removing the Commission's Minimum	)	
Sub-carrier Requirement for OFDM	)	
Modulation in MDS and ITFS Services	)	
	)	

To: Mass Media Bureau

COMMENTS OF THE CATHOLIC TELEVISION NETWORK

The Catholic Television Network ("CTN"), by its undersigned attorneys, hereby comments on the request of Cisco Systems, Inc. ("Cisco"), for a declaratory ruling that the Commission will remove a restriction on permitted Orthogonal Frequency Division Multiplexing ("OFDM") modulation in the Multipoint Distribution Service ("MDS") and Instructional Television Fixed Service ("ITFS").[1] Cisco seeks a ruling that a minimum of 256 QAM-modulated carriers (or tones) is not necessary in order to use OFDM modulation.

CTN is an organization representing 18 Roman Catholic dioceses and archdioceses, each of which is licensed to provide ITFS in its local parish schools and communities. CTN's members are in the process of implementing new fixed

[1] See Pleading Cycle Established for Comments on Request for Declaratory Ruling to Remove Minimum Sub-carrier Requirement for Orthogonal Frequency Division Multiplexing Modulation, DA 01-1582 (released July 5, 2001).

two-way services for their ITFS stations, using digital technologies. Accordingly, CTN's members have an interest in Cisco's proposal to modify the Commission's policies on the digital technologies available for ITFS systems.

Currently, MDS and ITFS stations are permitted to use digital emissions that meet certain requirements for power spectral uniformity and out-of-band emissions.[2] Based on a petition filed by Clarity Wireless, Inc., MDS and ITFS stations can utilize OFDM with a minimum of 256 QAM-modulated carriers (or tones).[3] The Commission placed this limit on OFDM signals consistent with a technical study submitted by Clarity that used 256-tone and 4096-tone signals to generate worst case examples that still met the Commission's power spectral density requirements. Cisco now contends that the 256-tone examples in Clarity's petition were merely illustrative and eliminating the 256-tone lower limit will not increase the potential for interference into MDS and ITFS transmissions.

As discussed more fully in the attached Engineering Statement, CTN generally agrees with Cisco's evaluation of OFDM signals with respect to digital-to-digital interference. However, Cisco's analysis fails to address adequately digital-to-analog interference, and many ITFS stations still operate with analog equipment.

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[2] See Request for Declaratory Ruling on the Use of Digital Modulation by Multipoint Distribution Service and Instructional Television Fixed Service Stations, 11 FCC Rcd 18839 (1996).

[3] See Request for Declaratory Ruling on the Use of Orthogonal Frequency Division Multiplexing Modulation by Multipoint Distribution Service and Instructional Television Fixed Service Stations, 14 FCC Rcd 4121 (1999); see also 47 C.F.R. § 21.905(b), 47 C.F.R. § 74.936(a).

As CTN's engineers point out, lower level QAM spectral energy may concentrate in certain portions of a 6 MHz channel. Unless there is a randomizer or "dithering process" in the digital encoder, then it is possible in a steady state for the spectral energy to concentrate and increase amplitude. As a result, if a lower level QAM signal met the 45 dB D/U co-channel interference ratio in its spread out state, the D/U ratio may degrade to an interference-causing sub-45 dB during steady state video modulation conditions. The OFDM transmissions could then cause an annoying interference pattern in the video portion of an analog signal. This phenomenon can be avoided if the digitizing system includes a randomizer to ensure digital spectral "hot spots" are not created within the 6 MHz channel.

CTN therefore recommends that the Commission adopt Cisco's proposal only with a condition on use of OFDM modulation with lower level QAM carriers, such as the following:

> Any MDS or ITFS licensee proposing to use OFDM modulation with less than 256 QAM-modulated carriers (or tones) must demonstrate in its application that:
>
> (a) the proposed transmission meets the 45 dB D/U interference ratio as to all relevant co-channel stations for the worst case digital spectral energy signature; or,
>
> (b) the digital encoder includes a randomizer that ensures the spectral energy is spread over the entire channel bandwidth.

For the reasons set forth above, CTN does not object to Cisco's proposal to remove the restriction on the use of OFDM modulation, as long as the Commission

imposes a condition on use of OFDM modulation that ensures interference into analog ITFS transmissions will be avoided.

Respectfully submitted,

CATHOLIC TELEVISION NETWORK

William D. Wallace
CROWELL & MORING LLP
1001 Pennsylvania Avenue, N.W.
Washington, D.C. 20004-2595
(202) 624-2500

Its Attorneys

Date: July 19, 2001

Catholic Television Network • Comments to Cisco Systems, Inc. Request for Declaratory Ruling

Joint Engineering Statement of John F.X. Browne, P.E., Robert W. Denny, Jr., P.E., and Dane E. Ericksen, P.E.

The firms of John F.X. Browne and Associates, P.C., Denny & Associates, P.C., and Hammett & Edison, Inc., have been retained jointly on behalf of the Catholic Television Network ("CTN"), representing numerous Instructional Television Fixed Service ("ITFS") stations licensed to, and operated by Roman Catholic Archdioceses and Dioceses throughout the United States, in support of CTN comments to the March 13, 2001, Request for Declaratory Ruling by Cisco Systems Inc. ("Cisco") regarding digital modulation for ITFS and MMDS stations.

Cisco Request

1. The Cisco Request for Declaratory Ruling asks the Commission to declare that levels of quadrature amplitude modulation ("QAM") lower than 256 are permissible. CTN has concerns about such a request, and is filing these comments to ensure that those concerns are addressed in any Declaratory Order that the Commission might issue in response to the Cisco request.

2. First, we note that the Technical Annex ("Annex") submitted by Cisco in support of its request is of unknown authorship and is not certified. Nevertheless, we do not have a problem with the analysis regarding digital-into-digital interference contained in the Annex; what does concern us is that the Annex does not adequately address digital-into-analog interference. There are still many ITFS systems that continue, and intend to continue, to transmit traditional NTSC analog signals.

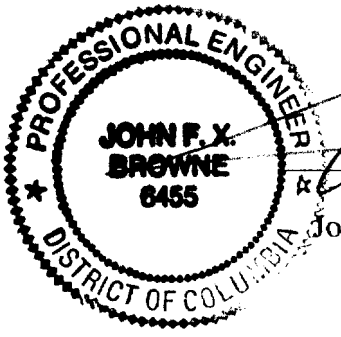
3. Our concern is that for lower level QAMs spectral energy might concentrate at certain portions of the 6-MHz channel, and this concentration of energy could then act like discrete-frequency interfering signals and cause an annoying "beat" interference pattern in the video portion of an analog signal. It is because of the sensitivity of the NTSC analog signal to energy appearing at some frequencies but not others, that analog-into-analog interference is reduced by using frequency offsets, and also that upper first-adjacent digital television stations sited within 88 kilometers of a full-service NTSC TV station must maintain a precise frequency relationship (offset) between the 8VSB pilot and the visual carrier of the lower adjacent channel NTSC station.*

4. As long as the co-channel desired-to-undesired ("D/U") interference criterion of 45 dB or better is maintained (and the Cisco request does not propose relaxing this criterion), then it should not matter whether discrete packets of spectral energy are in fact created from lower level QAMs;

* See Section 73.622(g)(1) of the FCC Rules.

its spectral energy over a 6-MHz wide channel, and if there is no randomizer or "dithering" process in the digital encoder, then it is possible that for fixed scenes the spectral energy could concentrate and increase in amplitude. In that event a lower level QAM signal that was giving a 45 dB D/U ratio in its spread out state could degrade to a lower D/U ratio, which could then result in visible interference to the analog signal.

5. CTN therefore requests that the Declaratory Order either confirm that the 45 dB co-channel D/U ratio, and the 0 dB adjacent-channel D/U ratio, must always be based on the worst case digital spectral energy, or that if a QAM lower than 256 is used then the digitizing system must include a randomizer to ensure that digital spectral "hot spots" within the 6-MHz wide channel are not created.



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Dane E. Ericksen, P.E.
Hammett & Edison, Inc.
Consulting Engineers

July 19, 2001

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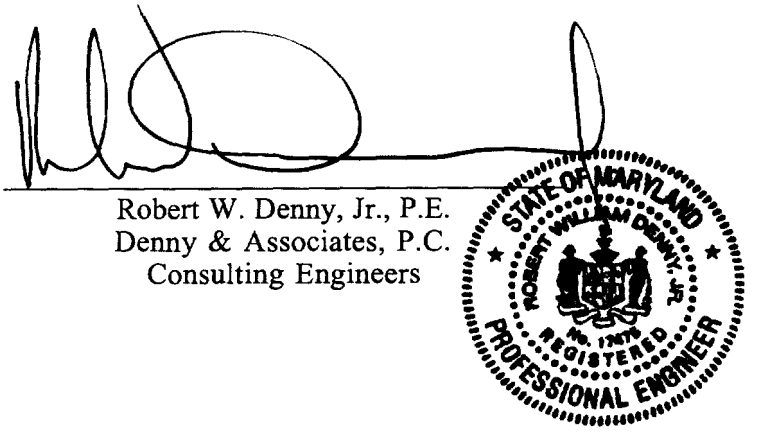

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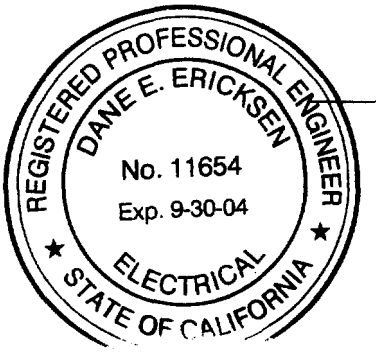


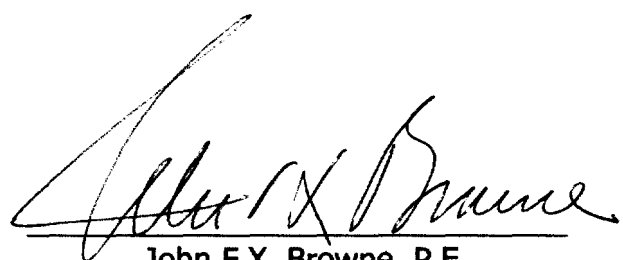
Dane E. Ericksen, P.E.
Hammett & Edison, Inc.
Consulting Engineers

July 19, 2001

DECLARATION

I hereby declare that I corroborated with Dane Ericksen, P.E., in the preparation of comments of the Catholic Television Network (Joint Engineering Statement) regarding the Request for Declaratory Ruling submitted to the Commission by Cisco Systems, Inc.

The statements of fact contained in the Joint Engineering Statement are true to the best of knowledge and belief.



John F.X. Browne, P.E.
July 19, 2001

DENNY & ASSOCIATES, P.C.
CONSULTING ENGINEERS
OXON HILL, MARYLAND

JOINT ENGINEERING STATEMENT IN SUPPORT OF COMMENTS OF CATHOLIC TELEVISION NETWORK TO CISCO SYSTEMS, INC. REQUEST FOR DECLARATORY RULING

Affidavit

STATE OF MARYLAND)
) ss:
COUNTY OF PRINCE GEORGE'S)

Robert W. Denny, Jr., being first duly sworn, says that he is president and treasurer of the firm of Denny & Associates, P.C., consulting engineers with offices in Oxon Hill, Maryland; that he is a professional engineer registered in the State of Maryland, the District of Columbia, and other jurisdictions; that his qualifications as an expert in radio engineering are a matter of record with the Federal Communications Commission; that the foregoing exhibit was prepared by him or under his direction; and that the statements contained therein are true of his own personal knowledge except those stated to be on information and belief and, as to those statements, he verily believes them to be true and correct.

Robert W. Denny, Jr., P.E.

Subscribed and sworn to before me this 19th day of July, 2001.

Lucille L. Rice

Lucille L. Rice
Notary Public, State of Maryland
My Commission Expires April 7, 2004

Affidavit

State of California | ss:
County of Sonoma |

Dane E. Ericksen, being first duly sworn upon oath, deposes and says:

1. That he is a qualified Registered Professional Engineer, holds California Registration No. E-11654, which expires on September 30, 2004, and is employed by the firm of Hammett & Edison, Inc., Consulting Engineers, with offices located near the city of San Francisco, California,

2. That he graduated from California State University, Chico, in 1970, with a Bachelor of Science Degree in Electrical Engineering, was an employee of the Field Operations Bureau of the Federal Communications Commission from 1970 to 1982, with specialization in the areas of FM and television broadcast stations and cable television systems, and has been associated with the firm of Hammett & Edison, Inc., since October 1982,

3. That the firm of Hammett & Edison, Inc., Consulting Engineers, has been retained jointly on behalf of the Catholic Television Network ("CTN"), representing numerous Instructional Television Fixed Service ("ITFS") stations licensed to, and operated by Roman Catholic Archdioceses and Dioceses throughout the United States, in support of CTN comments to the March 13, 2001, Request for Declaratory Ruling by Cisco Systems Inc. regarding digital modulation for ITFS and MMDS stations,

4. That such engineering work has been carried out by him or under his direction and that the results thereof are attached hereto and form a part of this affidavit, and

5. That the foregoing statement and the report regarding the aforementioned engineering work are true and correct of his own knowledge except such statements made therein on information and belief and, as to such statements, he believes them to be true.

Dane E. Ericksen, P.E.

Subscribed and sworn to before me this 19th day of July, 2001

AMY L. MILLER
Commission # 1197811
Notary Public - California
Sonoma County
My Comm. Expires Oct 4, 2002

CERTIFICATE OF SERVICE

I, William D. Wallace, hereby certify that I have on this 19th day of July, 2001, caused copies of the foregoing "Comments of the Catholic Television Network" to be served upon the following parties via hand delivery (indicated by an *) or first-class United States mail, postage prepaid:

Brad Lerner *
Mass Media Bureau
Video Services Division
Federal Communications Commission
445 12th Street, S.W., Room 2-A733
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William D. Wallace